ARJUNA

JEE

LECTURE - 08

Mole Concept

Sarvesh sir

TABLE OF CONTENT

01 concentration

02 Mass percentage

03

04

Q. Percentage of ~~oxygen~~ nitrogen and ~~nitrogen~~ oxygen in nitrogen oxide (N_xO_y) are 26% and 74 % respectively , calculate the value of X+Y

(A) 7

(B) 6

(C) 4

(D) 2

Sol^{n}.

$N_2O_5 = N_xO_y$

$x = 2$

$y = 5$

$x + y = 7$

N : O

$\frac{26}{14} : \frac{74}{16}$

1.85 : 4.6

$\frac{1.85}{1.85} : \frac{4.6}{1.85}$

N : O

(1 : 2.5) x2

(2) : 5

A = 17%

B = 38%

C = 34%

D = 80%

Meri taraf se galti hai SORRY.

Q→ Compound (X) Contains H = 5.88% and O = 94.12% approx. Calculate Empirical formula of compound (X). also find out Molecular formula, If M.wt of compound (X) is 34

(a) HO, H_2O → X

(b) X H_2O, H_2O

(c) X H_2O_2, H_2O_2

(d) ✓ $H\underline{O}$, H_2O_2

H : O

$\frac{5.88}{1} : \frac{94.12}{16}$

5.88 : 5.88

1 : 1

HO → Empirical formula

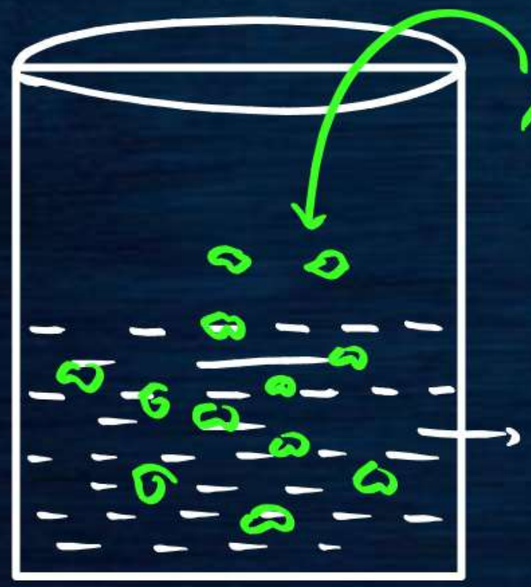
M.F. = n (E.F.)

$n = \frac{\text{M.wt of Comp. (X)}}{\text{Wt. of E.F. of comp(X)}}$

$n = \frac{34}{17} = 2$

M.f = 2*(HO) = H_2O_2

CONCENTRATION



Solute + Solvent = Solution

↓ Jo amount me kam ho

Jo amount me jada ho

⇒ If amount of solute and solvent is same

Solvent = Solution jiski tarah dikhta hai, usi ko solvent kahate hai

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Q 10 gram sugar added in 50 gram H_2O liquid

Select correct statement

(a) Solute → water

(b) Solute → sugar

(c) Solvent → Water

(d) ✓ b, & c both correct

sugar = 10 gram → solute

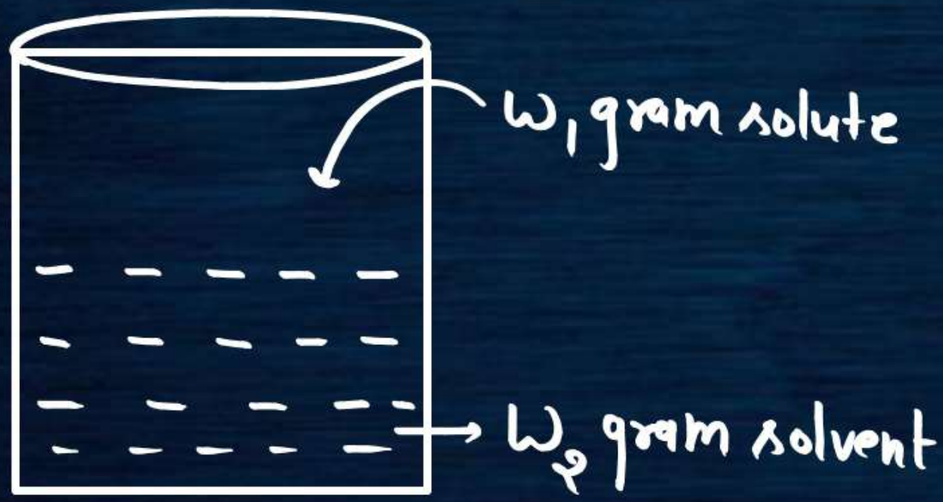
water = 50 gram → solvent

MASS PERCENTAGE (w/w %)

Total amount of solute dissolved in 10^2 gram or 100 gram of solution

Suppose → 1 → solute

2 → solvent



Mass of solution = $(w_1 + w_2)$ gram

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$C_{SD} = 23$ (Concept By Saurvesh Dixit

(1) Mass % of solute = $\frac{w_1}{w_1+w_2} \times 100 = \frac{\text{Mass of solute}}{\text{Mass of solution}} \times 100$

(2) Mass % of solvent = $\frac{w_2}{w_1+w_2} \times 100 = \frac{\text{Mass of solvent}}{\text{Mass of solution}} \times 100$

(3) Mass % of solute + Mass % of solvent = 100

(4) Mass fraction of solute = $\frac{w_1}{w_1+w_2} = \frac{\text{Mass of solute}}{\text{Mass of solution}}$

(5) Mass % of solute = Mass fraction of solute $\times 100$

Q 4 gram NaOH dissolved in 36 gram water. Calculate

(a) Mass fraction of NaOH

(b) also Calculate Mass % of NaOH

(c) Mass % of water

Soln → (a) Mass fraction of NaOH $= \frac{W_{NaOH}}{W_{NaOH}+W_{H_2O}} = \frac{4}{4+36} = \frac{4}{40} = \frac{1}{10}$

(b) Mass % of NaOH $= \frac{W_{NaOH}}{W_{NaOH}+W_{H_2O}} \times 100 = \frac{1}{10} \times 100 = 10\%$

(c) Mass % of water $= 100 - 10\% = 90\%$

Q. 20 gram of NaOH dissolved in 100 gram of water calculate mass percentage of NaOH

A = 89%.

A	16.67%	B	6.67 %
C	66.7%	D	10%

Sol^{n} ⇒ Mass % of NaOH = $\frac{W_{NaOH}}{W_{NaOH}+W_{H_2O}} \times 100$

$= \frac{20}{20+100} \times 100 = \frac{\cancel{20}}{\cancel{120}_{6}} \times 100$

$= \frac{100}{6} = \frac{50}{3} = 16.67\%$.

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Q. 40 gram NaOH dissolve in 100 gram H_2O. Select correct statements for about solution.

A. Mass % of NaOH is 28.57

B. Mass fraction of NaOH is 0.2857

C. Both A and B are correct

D. None

C = 60%.
A = 27%.
B = 6%.

$$\text{Mass fraction of NaOH} = \frac{w_{NaOH}}{w_{NaOH} + w_{H_2O}}$$

$$= \frac{40}{140} = 0.2857$$

$$\text{Mass \% of NaOH} = 0.2857 \times 100 = 28.57$$

$C_{SD} = 24$

① density ⇒ Mass ko volume / volume ko mass convert krne ke liye kam aati hai

$$d = \frac{M}{V}, \quad \boxed{M = d \times V}$$

$$M_{sol^n.} = d_{sol^n.} \times V_{sol^n.}$$

$$M_{solvent} = d_{solvent} \times V_{solvent}$$

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Q. 20 gram of NaOH dissolved in 100 ml of water solution at 300K temperature. If the density of solution is 1.2 gram/ml than calculate mass percentage of NaOH.

$M = d \times V$

A 33%

B 3.3%

C 16.67%

D 4%

Sol^n → Mass % of NaOH = $\frac{W_{NaOH}}{W_{NaOH} + W_{H_2O}} \times 100$

$= \frac{20}{W_{solution}} \times 100$

$= \frac{20}{120} \times 100 = \frac{100}{6} = \frac{50}{3} = 16.67\%$

$V_{sol^n} = 100\ ml$

$d_{sol^n} = 1.2\ g/ml$

Mass of sol^n $= d_{sol^n} \times V_{sol^n}$

$= 100\ ml \times 1.2 \frac{g}{ml}$

$= 120\ gm$

Q-1. 18 gram glucose dissolved in 100ml of water liquid if density of water liquid is 1 g/ml. than Calculate Mass %. of glucose → (a) 20%. (b) 10%. (c) 15%. (d) None

Soln → Mass %. of glucose $= \frac{W_{glu}}{W_{glu}+W_{H_2O}} \times 100$

$= \frac{18}{(18+100)} \times 100$

$= 15.25\%$

$d_{solvent} = 1\ g/ml$

$V_{solvent} = 100\ ml$

$M_{solvent} = d \times V$

$= 1 \times 100$

$= 100\ gram$

Q-2 18 gram glucose present in 100ml of aqueous solution of glucose, if density of glucose solution is 1 g/ml then calculate Mass % of glucose → (a) 20 %. (b) 10 %. (c) 15 %. (d) None

Sol^{n}.

$$\text{Mass \% of glucose} = \frac{W_{glu}}{W_{glu}+W_{H_2O}} \times 100 = \frac{W_{glu}}{W_{solution}} \times 100$$

$V_{sol^{n}.} = 100ml$

$d_{sol^{n}.} = 1 g/ml$

$M_{sol^{n}.} = d_{sol^{n}.} \times V_{sol^{n}.}$

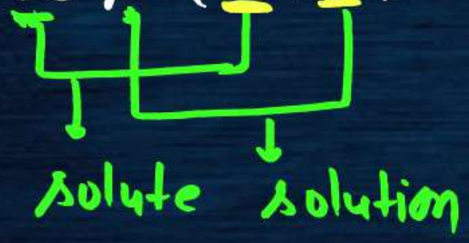
$= 1 \times 100 = 100 gram$

$= \frac{18}{100} \times 100$

$= 18\%$.

$C_{SD} = 25$

→ x % (w/w) of solution = Meaning ⇒ x gram solute present in 100 gram solution



Mass of solute = x gram

Mass of solution = 100 gram

Mass of solvent = $(100 - x)$ gram

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$C_{SD} = 26$

→ x% (w|v) of sol^{n} ⇒ x gram of solute present 100ml of solution

w = gram, v = ml

→ Mass of solute = x gram

→ Volume of solution = 100ml

→ Mass of solution = $(d_{sol^{n}} \times 100)$ gram

→ Mass of solvent = $(100\, d_{sol^{n}} - x)$ gram

② x% (v|v) of solution

Volume of solute = x ml

Volume of solution = 100ml

Volume of solvent = (100-x) ml

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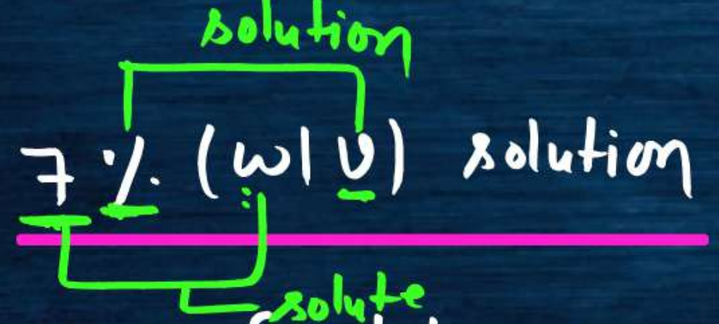
Q 7% (w/v) solution (More than one Ans correct)



(a) Mass of solute = 100gram

(b) Mass of solute = 7gram

(c) Mass of solution = 100gram

(d) Volume of solution = 100ml

ARJUNA

Q 13% (w/w) of NaOH solution (More than one Ans. correct)

solution

solute

Select correct option

(a) Mass of solvent = 13 gram

(b) Mass of solute = 13 gram

(c) Mass of solution = 100 gram

(d) Mass of solvent = 87 gram

Ex → 20% (w/w) of NaOH solution

Mass of solute = 20 gram
(NaOH)

Mass of solution = 100 gram

Mass of water (solvent) = 100 - 20 = 80 gram

Ex → 30 % (w/w) H_2SO_4 aqueous sol^n.

solute solution

Q-1 Mass of H_2SO_4 (solute) = 30 gram

Q-2 Mass of solution = 100 gram

Q-3 Mass of solvent (water) = 100 - 30 = 70 gram

Home work

NO Home work

Thank - You